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THE FOOD HABITS OF CNEMIDOPHORUS TESSELLATUS TESSELLATUS (SAY).

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From a study of the food habits of the common western variety of race-runners, *Cnemidophorus tessellatus tessellatus* (Say), it becomes evident that this lizard, in common possibly with the widespread eastern species, is the most beneficial lizard in North America. Fourteen species and varieties of race-runners are recognized in the United States, but only two have a wide geographical distribution. One of these is *C. tessellatus tessellatus*, the most common and most widespread western form, while the other is the well-known *C. sexlineatus* of the East and South.

The sixty-three specimens whose stomach contents formed the basis of this study were taken from various localities throughout the greater part of the range of this species in western Utah. From the accompanying table we see that Lepidoptera, largely caterpillars, form 37.7 per cent of the total bulk of food. Grasshoppers constitute 14.4 per cent. These two groups of insects alone, caterpillars and grasshoppers, form about 52 per cent of the total food. The item next in importance is beetles, representing 14.2 per cent, of which one-sixth is wireworms. Remaining we have miscellaneous insects, 14.27 per cent; arachnids, 8.2 per cent; unidentified insect and animal remains, 9.0 per cent; and sand and bits of wood, 2.23 per cent. Hymenoptera, usually considered as one of the most beneficial orders of insects, represent less than 1 per cent of the total food. Without entering into a discussion of the economic status of the various items of food, it is evident that a high percentage of the total food consists of noxious insects. It will be noted that speci-

mens 331 to 334, inclusive, contained bits of wood. These are four of the ten specimens taken at Clearfield. The area in which the specimens were collected has a very sandy soil, covered by a rather dense growth of sagebrush. This sand is not loose and shifting but in most places is firmly packed and covered by a coat of debris. The bits of wood were no doubt swept in with the grasshoppers just as sand is often ingested along with insects. One other specimen only, number 339, from Rockville, contained bits of wood.

In arriving at a correct estimate of the value of this reptile other things than just the nature of its food must be considered. *C. tessellatus tessellatus* is a large lizard, attaining a maximum length of over 12 inches, of which 3¼ to 4 inches represents body length. It is therefore physically possible for this lizard to consume rather large quantities of food because of its size. Furthermore, although occurring in the desert parts of the country where its insectivorous habits might not have so much economic bearing, this lizard is by no means confined to waste places. It is usually found in a dry sandy area, but this habitat often adjoins cultivated land which it may frequent in search of food. This is illustrated in specimen number 335 taken in an alfalfa field in Lehi. In addition to other food, this individual had eaten 18 alfalfa weevil larvae forming 40 per cent and 2 larvae of the alfalfa butterfly forming 38 per cent of its stomach contents. In the drier parts of Davis County these lizards often come into alfalfa fields, orchards, and other cultivated fields.

The numbers of race-runners in agricultural sections are much fewer now than formerly. Great numbers have disappeared with the reclamation of land, and unfortunately there has been an accompanying wanton destruction of them by firearms. Where the race-runner comes in contact with cultivated lands it renders a service to agriculture only less than that of our most useful insectivorous birds because its daily food requirements are not so great.

A detailed analysis of the stomach contents is given in the following table:

STOMACH CONTENTS OF CNEMIDOPHORUS TESSELLATUS TESSELLATUS (SAY).

No.	Sex	Lepidoptera	%	Orthoptera	%	Coleoptera	%	Miscellaneous Insects	%	Arachnids	%	Unidentified Animal Matter	%	Notes
325	♂			1 Acrididae nymph	75			1 insect (unid.)	25					
326	♀									1 spider	100			
327	♂			10 Acrididae nymphs 2 Acrididae adults	86			1 Lygaeidae	7			Insect remains	7	
328	♂			1 Acrididae nymph	50							Insect remains	50	Juvenile
329	♀			8 Acrididae nymphs 1 Mantidae nymph	90 1			1 Chrysopidae larva 1 small moth 2 ants	1 2 3	2 spiders	3			
330	♀			1 Acrididae	25	1 beetle	50					Animal remains	25	
331	♂			2 Acrididae nymphs	25									Juvenile; contained small pieces of dried wood—75%
332	♀	1 larva	10	2 Acrididae nymphs	70									Juvenile; contained small pieces of dried wood—20%
333	♂			8 Acrididae nymphs	95			1 Scolops (family Fulgoridae)	1	1 spider	5	1 larva Insect remains	.5 2.5	Juvenile; contained bits of dried wood —0.5%
334	♂			1 Acrididae	60			1 Myrmeleon larva 1 insect (unid.)	2 10			Animal remains	21	Juvenile; contained bits of dried wood—5%; sand—2%
335	♀	2 larvae of alfalfa butterfly	38	1 Acrididae	15	18 larvae of alfalfa weevil P. posticus	40	1 Jassidae	3	1 spider	4			Taken in alfalfa field
336	?	2 adults	95					1 fly	5					Juvenile; only a few days old
337	♂					1 large Scarabaeidae	95	1 fly	5					
338	♂	1 adult	5	4 Acrididae nymphs	50			1 Diptera 1 larva	5 5			Animal remains	35	
339	♂	1 larva	80									Animal remains	10	Contained piece of dried wood—10%
340	♀											Insect remains	95	Contained 4 small pebbles—5%
341	♀													Stomach empty
342	♂	5 larvae	85					1 insect (unid.)	5			Animal remains	10	
343	♂	1 pupa 4 larvae	10 60					1 large Diptera	20			Insect remains	10	

STOMACH CONTENTS OF CNEMIDOPHORUS TESSELLATUS TESSELLATUS (SAY)—Continued.

No.	Sex	Lepidoptera	%	Orthoptera	%	Coleoptera	%	Miscellaneous Insects	%	Arachnids	%	Unidentified Animal Matter	%	Notes
344	♀	2 larvae	25			1 beetle	25					Animal matter—probably larval remains	50	
345	♀	4 larvae	40					2 Myrmeleon larvae	20			Larval remains	40	
346	♂	6 larvae	90			1 beetle	6							Sand—1%
						1 pupa	3							
347	♂	4 larvae	70							1 spider	24	Animal remains	5	Sand—1%
348	♀	1 larvae	98											Sand—2%
349	♀	3 larvae	50			2 large Scarabaeidae	49							Sand—1%
350	♀	10 larvae	74	1 small Acrididae nymph	1					2 Solpugidae	24			Sand—1%
351	♀									1 large Scorpion	100			
352	♂	2 larvae	92			beetle remains	8							Juvenile
353	♂	4 larvae	75			1 beetle	10							
		2 pupae	10			1 larvae	5							
354	♂	4 larvae	50			1 wireworm (Family Elateridae)	25							
		2 pupae	25											
355	♀	11 larvae	95					2 mealy bugs	2			Animal remains	2	Sand—1%
356	♀	7 larvae	75	1 Acrididae nymph	3	1 beetle	8					Insect remains	9	Sand—1%
		1 pupa	4											
357	♀	6 larvae	60											
		10 pupae	40											
358	♀	2 larvae	90	grasshopper remains	10									
359	♀	7 larvae	80									Insect remains	2	
		7 pupae	18											
360	♂	7 larvae	50	1 Acrididae nymph	2	3 beetles	24	3 Diptera	18					
						2 larvae	4	1 Jassidae	2					
361	♂	2 larvae	45			6 wireworms	45	1 Diptera	2	1 spider	3			Sand—1%
		2 pupae	4											
362	♂	4 larvae	58			2 beetles	30	1 small bee	2	1 Scorpion	10			
363	♀	5 larvae	42			9 wireworms	55							
						1 beetle	3							
364	♂	7 larvae	100											
365	♂													Empty; 1 round worm in stomach
366	♂							1 insect (unid.)	100					
367	♂							1 larva	45	1 Solpugidae	45	Animal remains	10	
368	♀	1 larvae	95									Animal remains	5	Juvenile
369	♀	2 larvae	12	5 Acrididae nymphs	60			1 insect (unid.)	2	1 spider	18			1 small pebble—2%
								2 Myrmeleon larvae	6					
370	♂	6 larvae	80	2 Acrididae nymphs	10	1 small beetle	2					Animal remains	7	Sand and 1 small pebble—1%

STOMACH CONTENTS OF CNEMIDOPHORUS TESSELLATUS TESSELLATUS (SAY)—Continued.

No.	Sex	Lepidoptera	%	Orthoptera	%	Coleoptera	%	Miscellaneous Insects	%	Arachnids	%	Unidentified Animal Matter	%	Notes
371	♂	5 larvae	50	4 Acrididae nymphs	45	1 beetle	3	1 insect (unid.)	2					
372	♀	1 larva	5	4 Acrididae nymphs	95									Juvenile
373	♂	11 larvae 1 adult	30 10			8 Rhynchophora 5 beetles	50	1 Myrmeleon larva	2	1 Solpugidae	7			Sand—1%
374	♂	1 moth	50	1 Acrididae nymph	25			1 Jassidae	3	2 spiders	22			
375	♀	26 larvae	80			beetle remains	10	1 Myrmeleon larva 1 insect (unid.)	2 2	1 Solpugidae	5			Sand—1%
376	♂			2 Acrididae nymphs	15	1 beetle	20	2 insects (unid.) 2 Hemiptera 1 Myrmeleon larva 1 termite	14 10 10 5	3 spiders	15	Animal remains	10	Sand—1%
377	♂							14 Jassidae 1 larva 1 insect (unid.)	30 9 9	6 spiders	50			2 small pebbles—2%
378	♀	29 larvae	60			3 beetles	14	4 Jassidae 2 Myrmeleon larvae	5 12	1 Solpugidae	5	Insect remains	3	Sand—1%
379	♂					remains of 6	70			2 spiders 1 Solpugidae	20 10			
380	♀	21 larvae	60					7 Jassidae 1 small Hymenoptera 1 small ant 20 termites 2 hemiptera	5 3 2 15 4	1 spider 1 Solpugidae	5 5			Sand—1%
381	♀					1 beetle	30	1 bee 2 hemiptera	40 30					
382	♂					1 beetle	25	1 Myrmeleon larva 1 Reduviidae 1 mealy bug	24 20 5	4 spiders	25			Sand—1%
383	♀	2 larvae	20			3 beetles	25	1 Myrmeleon larva 1 Jassidae	20 4	3 spiders	25	Animal remains	5	Sand—1%
384	♂					1 beetle	10	53 small Jassidae 1 Myrmeleon larva 1 insect (unid.)	55 10 9	3 spiders	15			Sand—1%
385	♀	1 larva	25					2 Jassidae 1 mealy bug 1 insect (unid.)	20 10 25	1 spider	20			
386	♀					1 beetle 1 larva	45 5	1 mealy bug	5			Insect remains	45	
387	♂											Insect remains	100	
Avg. per cent		37.7		14.4		14.2		14.27		8.2		9.0		Bits of wood—1.73 Sand —0.5